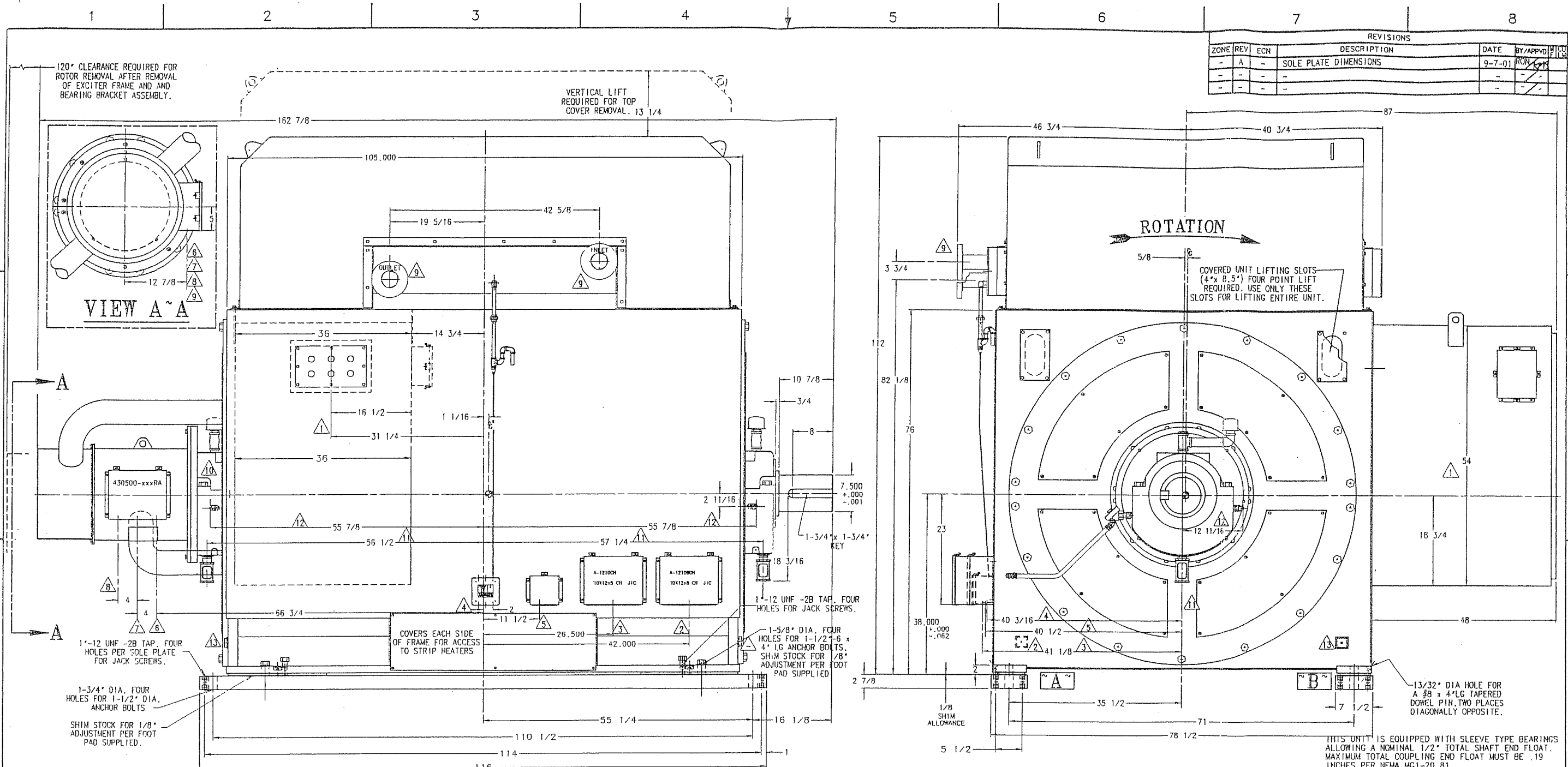


| REVISIONS | | | | | |
|-----------|-----|-----|-----------------------|--------|----------|
| ZONE | REV | ECN | DESCRIPTION | DATE | BY/APP'D |
| - | A | - | SOLE PLATE DIMENSIONS | 9-7-01 | RON |
| - | - | - | - | - | - |
| - | - | - | - | - | - |



- 1. CONDUIT BOX FOR STATOR FIELD LEADS. SEE INCOMING LINE BOX DRAWING 14CSB-1029 FOR DETAILS.
- 2. ONE HOLE FOR 1-1/2" CONDUIT FOR BEARING; STATOR WINDING; AND STATOR DISCHARGE AIR RESISTANCE TEMPERATURE DETECTOR LEADS.
- 3. ONE HOLE FOR 1-1/2" CONDUIT FOR BEARING VIBRATION SENSOR SWITCH LEADS.
- 4. THREE KNOCKOUT HOLES AVAILABLE FOR 1/2" CONDUIT FOR STATOR DISCHARGE AIR COOLER LEAK DETECTOR LEADS.
- 5. ONE HOLE FOR 1" CONDUIT FOR GENERATOR STRIP HEATER LEADS.
- 6. ONE HOLE FOR 1" CONDUIT FOR PERMANENT MAGNET ALTERNATOR FIELD LEADS.
- 7. ONE HOLE FOR 1" CONDUIT FOR EXCITER STRIP HEATER LEADS.
- 8. ONE HOLE FOR 1" CONDUIT FOR BRUSHLESS EXCITER FIELD LEADS.
- 9. STATOR DISCHARGE AIR COOLER WATER CONNECTION PORTS. CONNECTION POINT IS A 150 LB RATED; 3" RAISED FACE PIPE FLANGE.
- 10. OPPOSITE DRIVE END BEARING ONLY IS ELECTRICALLY INSULATED INTERNALLY FROM GROUND. ANY CONNECTIONS TO THE BEARING SHELL MUST BE INSULATED TO PRESERVE THE INTEGRITY OF THIS INSULATION.
- 11. BEARING OIL RETURN CONNECTION PORTS. CONNECTION POINT IS A 150 LB RATED; 1-1/2" RAISED FACE PIPE FLANGE.
- 12. BEARING OIL SUPPLY CONNECTION PORTS. CONNECTION POINT IS A 150 LB RATED; 1/2" RAISED FACE PIPE FLANGE.
- 13. UNIT GROUNDING PADS. TWO PADS DIAGONALLY OPPOSITE; EACH WITH ONE 5/16"-18 TAP x 3/4" DEEP HOLE.

DESCRIPTION:
 QUANTITY: 1

TYPE "SAB" HORIZONTAL BRUSHLESS SYNCHRONOUS GENERATOR RATED:
 9,500 KW; 1,800 SRPM; 3 PHASE; 80 HZ; 8 LEAD; 13,200 VOLTS;
 80°C RISE BY RESISTANCE; 0.95 POWER FACTOR, ABOVE A
 40°C AMBIENT, CONTINUOUS DUTY, CLASS "F" INSULATION.

ELECTRICAL FEATURES:

1. DAMPER WINDINGS.
2. INSULATION SYSTEM TO BE VPI-COMPLIANT STATOR.
3. CAPABLE OF OPERATING AT RATED kVA AND RATED TEMPERATURE RISE AT ALTITUDES OF 3,300 FEET ABOVE SEA LEVEL.
4. FIELD SUITABLE FOR EXCITATION FROM BRUSHLESS EXCITER.

MECHANICAL FEATURES:

1. SLEEVE BEARINGS, PRESSURE LUBRICATED, BRACKET MOUNTED.
2. OPPOSITE DRIVE END BEARING ELECTRICALLY INSULATED FROM GROUND.
3. MECHANICAL BALANCE PER NEMA STANDARD.
4. UNIT CAPABLE OF 125% OVERSPEED.
5. TOTALLY ENCLOSED AIR TO WATER ENCLOSURE (TEWAC) SUITABLE FOR 85°F CLEAN & FILTERED WATER @ 100 PSI MAX.
6. SOUND LEVEL OF 85 dba AT 3 FEET NO LOAD.

| ~ FOOT LOADS ~ | | | |
|----------------|-------------|------------------|----------------------|
| PAD | STATIC LOAD | FULL TORQUE LOAD | SHORT CIRCUIT TORQUE |
| A | 28,500 | 21,112 | 28,907 |
| B | 28,500 | 35,888 | 85,907 |

CERTIFIED FOR:
 TUTHILL ENERGY SYSTEMS
 1108 WASHINGTON STREET
 BURLINGTON, IA 52601

ESTIMATED WEIGHTS

| | |
|--------------|--------------------|
| ROTOR | 15,591 |
| STATOR FRAME | 37,015 |
| TOP COVER | 1,410 |
| COOLER (WET) | 2,404 |
| (DRY-2,275) | |
| PRIMARY BOX | 500 |
| TOTAL | 57,000 LBS. |

BEARING OIL REQUIREMENTS PER EACH BEARING

VISCOSITY: 150 VG32
 LOSSES: PER BRG. 3.2 HP/BRG
 INLET TEMP: 100°F
 MAX OUTLET TEMP: 140°F
 OIL PRESSURE: 15-20 PSI
 + 1.5 GPM

BEARING COOLING WATER REQUIREMENTS

85°F (29.4°C) CLEAN FILTERED WATER
 AT 140 USGPM. @ 100 PSI OR LESS.



IDEAL ELECTRIC CO.
 137 EAST FIRST STREET
 HANSHFIELD, OHIO 44132-7100

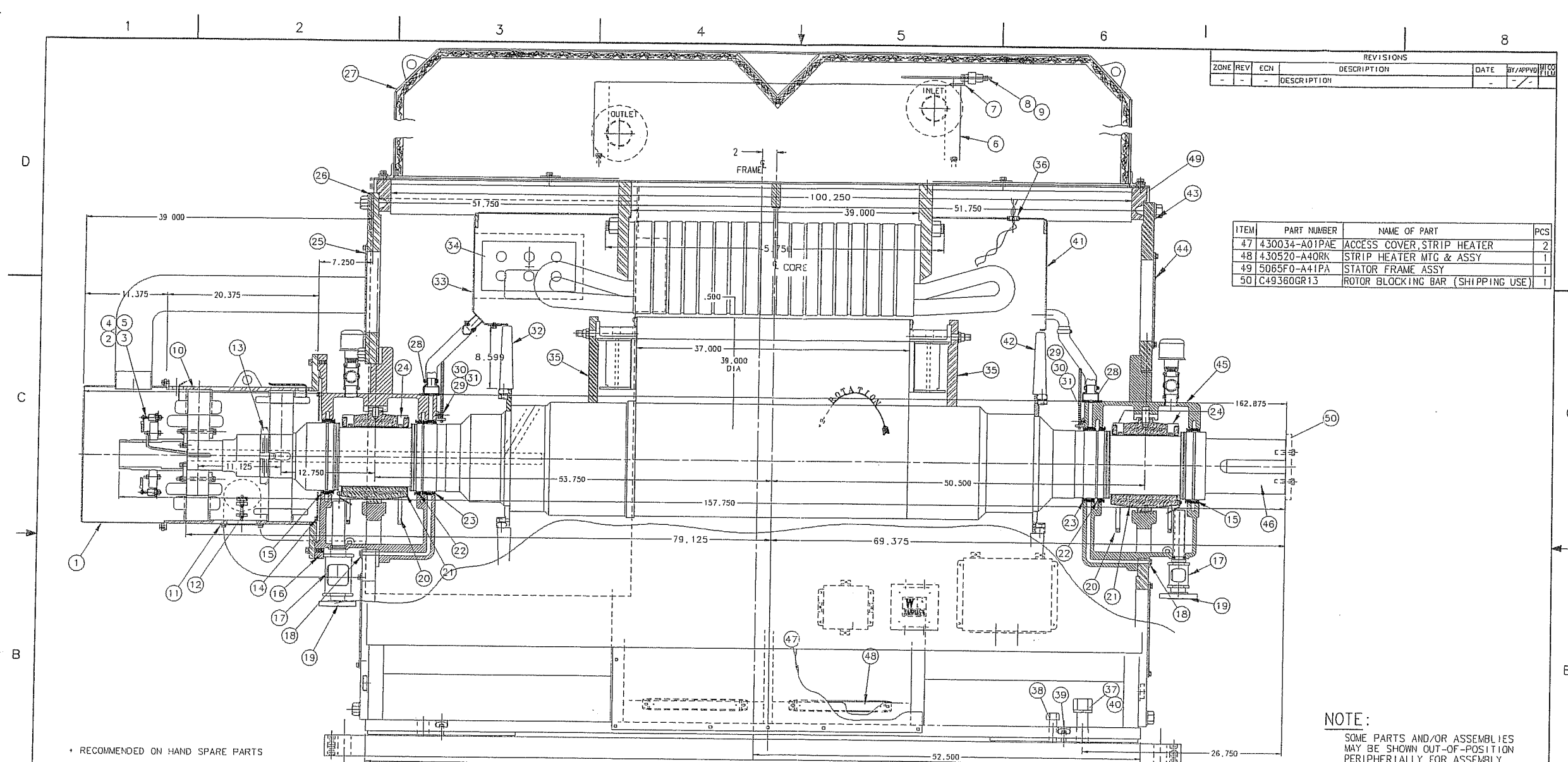
TEWAC 21520-4-37 / BE13-3 PMA 13-3

OUTLINE

8" SLEEVE BEARINGS

TITLE D

SCALE 3/16" = 1"



| REVISIONS | | | | | | |
|-----------|-----|-----|-------------|------|----------|-------|
| ZONE | REV | ECN | DESCRIPTION | DATE | BY/APP'D | CHK'D |
| - | - | - | DESCRIPTION | - | - | - |

| ITEM | PART NUMBER | NAME OF PART | PCS |
|------|---------------|-----------------------------------|-----|
| 47 | 430034-A01PAE | ACCESS COVER, STRIP HEATER | 2 |
| 48 | 430520-A40RK | STRIP HEATER MTG & ASSY | 1 |
| 49 | 5065F0-A41PA | STATOR FRAME ASSY | 1 |
| 50 | C49360GR13 | ROTOR BLOCKING BAR (SHIPPING USE) | 1 |

* RECOMMENDED ON HAND SPARE PARTS

| TYPE | RATING | SPEED | PHASE | WIRE | HERTZ | VOLTS | AMPS | FRAME | SERIAL NUMBER |
|--------|----------|-----------|-------|-------|-------|---|------|---------------------|---------------|
| SAB | 9,500 KW | 1,800 RPM | 3 | 6 | 60 | 13,200 | 489 | 21520-4-37 | 011077-01 |
| STATOR | ROTOR | FIELD | ARM | PMA | FIELD | PMA | ARM | CUSTOMER / END USER | |
| 26023 | 24677A | 25682 | 25681 | 23919 | 23918 | TUTHILL ENRGY / MILLER BREWERY, TRENTON, OH | | | |

| ITEM | PART NUMBER | PATT 'N | NAME OF PART | PCS |
|------|-------------------|---------|--|-----|
| 1 | 430033-A21PA | | RECTIFIER COVER | 1 |
| 2 | 5018E0-A09RA | | RECTIFIER ASSY | 1 |
| * 3 | 32355F | | RECTIFIER | 3 |
| * 4 | 32355R | | RECTIFIER | 3 |
| * 5 | 102147 | | SURGE PROT (B57826GR1 / 2KVS26-12A12BBS) | 1 |
| 6 | 917812 | | COOLER, STATOR DISCHARGE AIR | 1 |
| 7 | B73274PA | | MOUNTING BRACKET, RTD | 1 |
| 8 | 32230A120 | | RTD, MINCO S51PA 12.0 | 1 |
| 9 | 32210B | | HOLDER, SPRING LOADED RTD PROBE | 1 |
| 10 | 5018F6-A39PA | | EXCITER FRAME ASSY | 1 |
| 11 | B53715AGR6B | | ACCESS COVER, STRIP HEATER | 1 |
| 12 | 430520-A27RN | | STRIP HEATER ASSY | 1 |
| 13 | 100305 / 100328 | | LKWSHR, BRG W30 / LOCKNUT, BRG AN30 | 1ea |
| 14 | 43010B-A04PA & PB | | AIR BAFFLE | 1 |
| * 15 | B46804D2 | 4433 | SEAL, OIL INNER | 2 |
| 16 | 530115-A24RA | | BEARING HOUSING & CAP ASSY | 1 |

| ITEM | PART NUMBER | PATT 'N | NAME OF PART | PCS |
|------|-----------------|---------|-----------------------------------|-----|
| 17 | A50228GR6 | | GAUGE, OIL SIGHT | 2 |
| 18 | B74336PB | | PLATE, AIR ADJUSTING | 2 |
| 19 | 912341 / 910222 | | FLANGES, OIL DRAIN / SUPPLY PORTS | 2ea |
| 20 | B19175 | 3655 | OIL RINGS C BR | 4 |
| * 21 | 530105-A04RA | | BEARING SLEEVE 8" | 2 |
| * 22 | B46804D1 | 4433 | OIL SEAL, AIR PRESSURE | 2 |
| * 23 | B46803 | 4433 | OIL SEAL, INNER | 2 |
| 24 | 100257 | | WIPER, OIL RING | 4 |
| 25 | 430030-A10RA | | ACCESS COVER | 1 |
| 26 | C59849RA | | BRACKET, BEARING | 1 |
| 27 | 5065C8-A18RA | | TOP COVER ASSY | 1 |
| 28 | B38089 | 4228 | VENT, BEARING HOUSING AIR | 2 |
| 29 | B66746GR1 | | PLATE, VIBRATION PROBE MTG | 4 |
| 30 | 32005-00-40-05C | | PROBE, B/N #3301011-00-40-05-0205 | 4 |
| 31 | 32010C45 | | EXTENSION CABLE B/N | 4 |
| 32 | 430053-A16RM | | FAN ASSEMBLY | 1 |
| 33 | 5065B6-A18RA | | BAFFLE ASSY | 1 |
| 34 | B657DB | | LEAD CLEAT | 2 |
| 35 | C69434GR1 | | BALANCE RING | 2 |
| 36 | 101980 | | RUBBER GROMMET #H2872-45009 | 1 |

| ITEM | PART NUMBER | PATT 'N | NAME OF PART | PCS |
|------|--------------|---------|-------------------------------|-----|
| 37 | B14682AGR3 | | HOLD DOWN BOLTS | 4 |
| 38 | 30120K400 | | JACKSCREW 1" - 12 x 4" LG | 4 |
| 39 | A10800GR9 | | DOWEL PIN, TAPERED #8 x 4" LG | 4 |
| 40 | B60155GR15 | | SHIM SET (1/8" THK) | 4 |
| 41 | 5065B6-A08RA | | BAFFLE ASSY | 1 |
| 42 | 430053-A15RM | | FAN ASSY | 1 |
| 43 | D69267 | | BEARING BRACKET | 1 |
| 44 | C70455 | | ACCESS COVER | 1 |
| 45 | 530115-A23RA | | HOUSING ASSY, BEARING | 1 |
| 46 | 5065D1-A49RA | | SHAFT ASSY | 1 |

NOTE:
SOME PARTS AND/OR ASSEMBLIES
MAY BE SHOWN OUT-OF-POSITION
PERIPHERIALLY FOR ASSEMBLY
OR CLAIRITY PURPOSES.

OUTLINE DWG. ----- 5065A0-A9J
 MAPICS B/M ----- 065SAB04T67-14
 BRG B/M DR END ----- 21520-1-27
 BRG B/M OPP. DR END ----- 21520-2-31
 EXCITER FIELD B/M ----- BE13-309F
 MASS ELASTIC DIAGRAM -- B-MED-1606

| | | | |
|---|------------------|--|------------------|
| WORKING TOLERANCES UNLESS OTHERWISE SPECIFIED | | FIRST USED ON C 011077 ECN ORDER No. | DATE 09-29-01 |
| FINISH | DR. DATE | CHK. | APP. |
| 1 - 12 OVER 24.00" ✓ | 12 OVER 24.00" ✓ | | |
| 12 OVER 24.00" ✓ | 24 OVER 24.00" ✓ | | |
| 24 OVER 24.00" ✓ | OVER 24.00" ✓ | | |
| ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED | | | |
| ALL DIMENSIONS TO BE DIMS UNLESS OTHERWISE SPECIFIED | | | |
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IDEAL ELECTRIC CO.
 100 EAST 700TH STREET
 HANSHURST, OHIO 44822-9730

TEWAC 21520-4-37 / BE13-3 / PMA 13-3

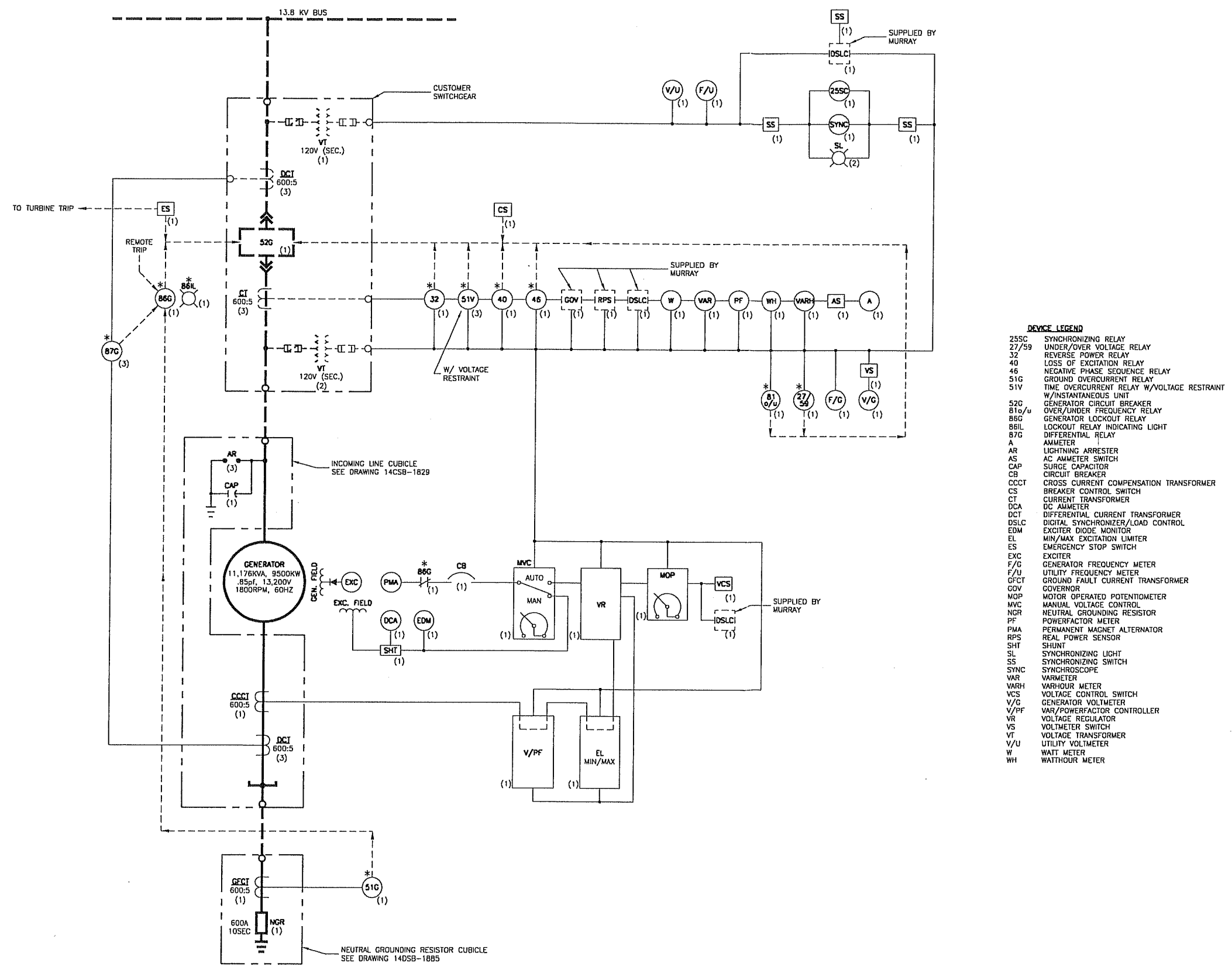
LAYOUT

8" SLV BEARINGS

5065C0-A62

Sheet 5/32 RIGHT Sheet 01 OF 01

| REV. | DESCRIPTION | BY |
|------|--|----|
| 0 | JULY 11, 2001 | HM |
| 1 | OCT. 16, 2001 ADDED DSLC, 67, REVISED DEVICE LEGEND, AND NOTES | ME |
| 2 | NOV. 9, 2001 REMOVED 67 RELAYS | HM |



- DEVICE LEGEND**
- 25SC SYNCHRONIZING RELAY
 - 27/59 UNDER/OVER VOLTAGE RELAY
 - 32 REVERSE POWER RELAY
 - 40 LOSS OF EXCITATION RELAY
 - 46 NEGATIVE PHASE SEQUENCE RELAY
 - 51G GROUND OVERCURRENT RELAY
 - 51V TIME OVERCURRENT RELAY W/VOLTAGE RESTRAINT
 - 52G W/INSTANTANEOUS UNIT
 - 81o/u GENERATOR CIRCUIT BREAKER
 - 86G OVER/UNDER FREQUENCY RELAY
 - 86IL GENERATOR LOCKOUT RELAY
 - 87G LOCKOUT RELAY INDICATING LIGHT
 - A AMMETER
 - AR LIGHTNING ARRESTER
 - AS AC AMMETER SWITCH
 - CAP SURGE CAPACITOR
 - CB CIRCUIT BREAKER
 - CCCT CROSS CURRENT COMPENSATION TRANSFORMER
 - CS BREAKER CONTROL SWITCH
 - CT CURRENT TRANSFORMER
 - DCA DC AMMETER
 - DCT DIFFERENTIAL CURRENT TRANSFORMER
 - DSLCL DIGITAL SYNCHRONIZER/LOAD CONTROL
 - EDM EXCITER DIODE MONITOR
 - EL MIN/MAX EXCITATION LIMITER
 - ES EMERGENCY STOP SWITCH
 - EXC EXCITER
 - F/G GENERATOR FREQUENCY METER
 - F/U UTILITY FREQUENCY METER
 - GFCT GROUND FAULT CURRENT TRANSFORMER
 - GOV GOVERNOR
 - MOP MOTOR OPERATED POTENTIOMETER
 - MVC MANUAL VOLTAGE CONTROL
 - NGR NEUTRAL GROUNDING RESISTOR
 - PF POWERFACTOR METER
 - PMA PERMANENT MAGNET ALTERNATOR
 - RPS REAL POWER SENSOR
 - SHT SHUNT
 - SL SYNCHRONIZING LIGHT
 - SS SYNCHRONIZING SWITCH
 - SYNCS SYNCHROSCOPE
 - VAR VARIOMETER
 - VARH VAR-HOUR METER
 - VCS VOLTAGE CONTROL SWITCH
 - V/G GENERATOR VOLT METER
 - V/PF VAR/POWERFACTOR CONTROLLER
 - VR VOLTAGE REGULATOR
 - VS VOLT METER SWITCH
 - VT VOLTAGE TRANSFORMER
 - V/U UTILITY VOLT METER
 - W WAIT METER
 - WH WATTHOUR METER

NOTES:
* - INDICATES DEVICES LOCATED IN GENERATOR RELAY CUBICLE. ALL OTHER DEVICES THAT DO NOT HAVE THEIR LOCATION NOTED ARE LOCATED IN THE GENERATOR INSTRUMENT CUBICLE.

ALL WIRING SHOWN DOTTED TO BE SUPPLIED BY OTHERS.

PHASE ROTATION A-C-B

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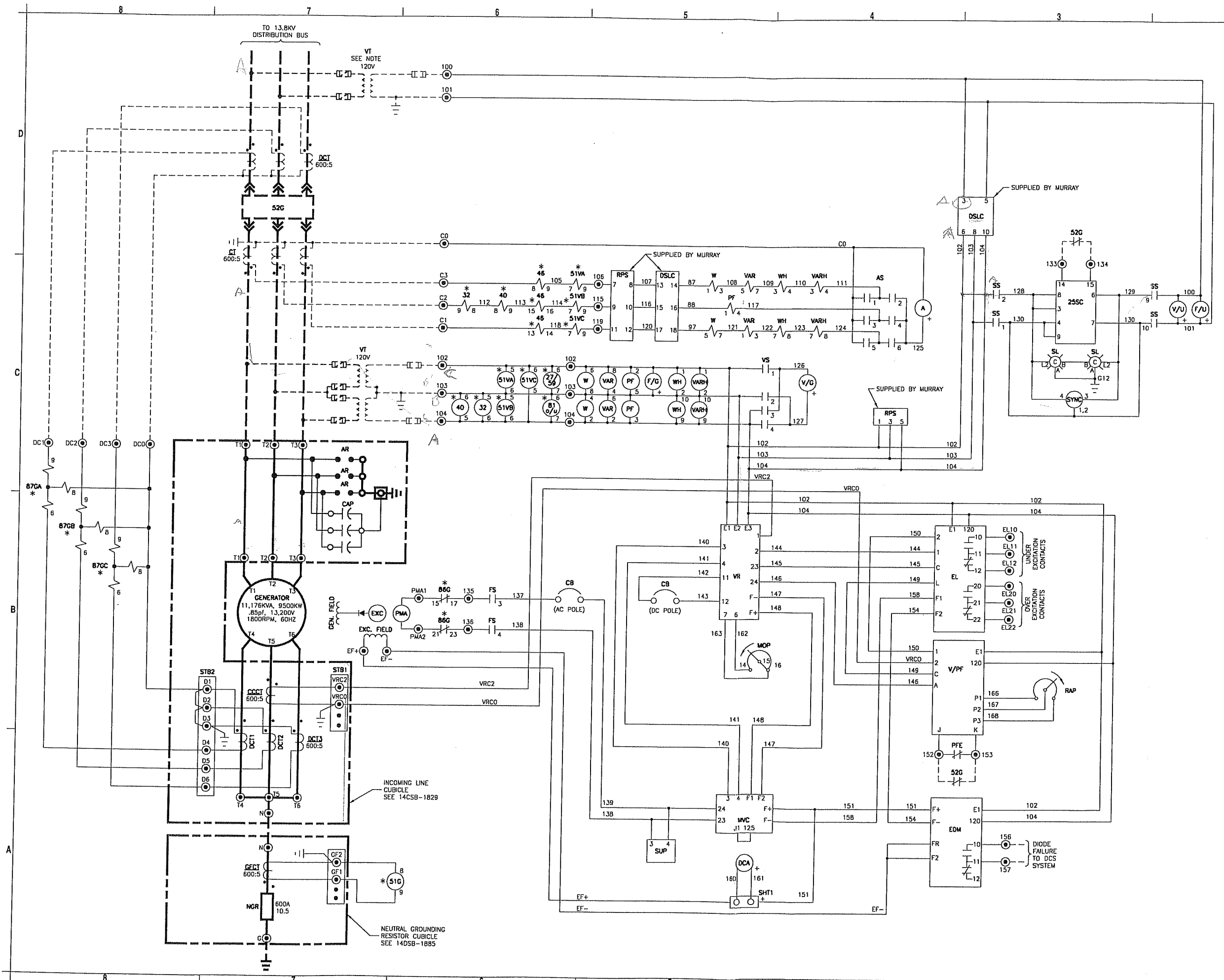
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ONE LINE DIAGRAM
GENERATOR RELAY & INSTRUMENT CUBICLES
TUTHILL ENERGY SYSTEMS

DRAWN BY: HM | CHECKED BY: CTG

IDEAL ELECTRIC
COMPANY
MANSFIELD, OHIO
USA



| REV. | DESCRIPTION | BY |
|------|---------------|----|
| 0 | JULY 11, 2001 | ME |
| 1 | OCT. 16, 2001 | HM |
| 2 | NOV. 9, 2001 | HM |
| 3 | DEC. 4, 2001 | HM |
| 4 | JAN. 3, 2002 | ME |
| 5 | JAN. 14, 2002 | HM |

DEVICE LEGEND

- 25S Synchronizing Relay
- 27/59 Under/Over Voltage Relay
- 32 Reverse Power Relay
- 40 Loss of Excitation Relay
- 46 Negative Phase Sequence Relay
- 51G Ground Overcurrent Relay
- 51V Time Overcurrent Relay w/Voltage Restraint w/Instantaneous Unit
- 52G Generator Circuit Breaker
- 810/u Over/Under Frequency Relay
- 86G Generator Lockout Relay
- 86L Lockout Relay Indicating Light
- 87G Differential Relay
- A Ammeter
- AH Alarm Horn
- AR Lightning Arrester
- AS AC Ammeter Switch
- CAP Surge Capacitor
- CB Circuit Breaker
- CCCT Cross Current Compensation Transformer
- CF Computer Port
- CR Control Relay
- CS Breaker Control Switch
- CTA Current Transformer
- DC Ammeter
- DCT Differential Current Transformer
- DSLC Digital Synchronizer/Load Control
- EDM Exciter Diode Monitor
- EDM Min/Max Excitation Limiter
- ES Emergency Stop Switch
- EXC Exciter
- F/G Generator Frequency Meter
- F/G Exciter Field Switch
- FU Fuse
- F/U Utility Frequency Meter
- GFCI Receptacle
- GFCI Ground Fault Current Transformer
- GIL Green Indicating Light
- GOV Governor Control
- HMI Human Machine Interface
- IL Indicating Light
- LF Line Filter
- LV Low Voltage Relay
- MOP Motor Operated Potentiometer
- MVC Manual Voltage Control
- NGR Neutral Grounding Resistor
- OSP Overspeed Protection Device
- PB Pushbutton
- PF Power Factor Meter
- PFE Power Factor Enable Switch
- PL Panel Light
- PLS Panel Light Switch
- PMA Permanent Magnet Alternator
- PWR Power Supply
- RAP Remote Adjustment Potentiometer
- RIL Red Indicating Light
- RPS Real Power Sensor
- RV Base Voltage Relay
- S Selector Switch
- SHT Space Heater
- SHT Shunt
- SL Synchronizing Light
- SS Synchronizing Switch
- STB Shorting Terminal Block
- SUP Spike Suppression Module
- SYNC Synchronoscope
- TD Temperature Detector
- TS Temperature Switch
- VAR Varometer
- VARH Varhour Meter
- VCS Voltage Control Switch
- V/G Generator Voltmeter
- V/PP VAR/Powerfactor Controller
- VR Voltage Regulator
- VS Voltmeter Switch
- V/U Voltage Transformer
- V/U Utility Voltmeter
- W Wait Meter
- WH Watthour Meter

NOTES:

* - INDICATES DEVICES LOCATED IN GENERATOR RELAY CUBICLE. ALL OTHER DEVICES THAT DO NOT HAVE THEIR LOCATION NOTED ARE LOCATED IN THE GENERATOR INSTRUMENT CUBICLE.

CUSTOMER BUS VT MUST PROVIDE 120 V. PHASE A TO PHASE B.

ALL WIRING SHOWN DOTTED TO BE SUPPLIED BY OTHERS

⊙ - INDICATES TERMINAL POINT FOR CUSTOMER CONNECTION.

PHASE ROTATION A-C-B

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SCHEMATIC DIAGRAM - POWER CIRCUITS
GENERATOR INSTRUMENT CUBICLE
TUTHILL ENERGY SYSTEMS

DRAWN BY: ME CHECKED BY: UIG

IDEAL ELECTRIC
 COMPANY
 MANSFIELD, OHIO
 USA